symptom referable to the nucleus of Deiters or the cerebellum such as hypotonia or asynergia of other parts have manifested themselves.

Dr. Weisenburg stated in closing that he was not at all certain that the differential diagnosis between an involvement of the vestibular branch and the semi-circular canals could be made and his object in presenting this case was to call the attention of the society to such a possibility.

THE PATHOGENESIS OF TABES DORSALIS

By Tom A. Williams, M.D., of Washington, D. C.

Controversy as to the pathogeny of tabes has not ceased since Duchenne surmised its sympathetic origin, and Charcot later supposed it to be a posterior column dystrophy, similar to that of Friedreich's ataxia. His great authority prevented due attention to the researches of Obersteiner and his followers, until the memoir of Redlich appeared in 1897. The discoveries as to the syphilitic etiology of tabes caused greater attention to the work of Nageotte, who in 1894 had indicated the constancy of lesions on the radicular nerve at the point where it receives its meningeal sheaths. These lesions correspond to one or other stage of the granulomatous process, varying as they do from simple round cell infiltration to granuloma, and even breaking down with formation of cavities. They are due to primary chronic meningitis, evidenced by the lymphocytosis found by spinal puncture during life, and postmortem when skillfully looked for; although the tendency of the process to resolution and fibrous-tissue formation leaves only a slight thickening in the membranes, already fibrous by nature.

The changes in the cord are consecutive to this. That this is so, is proved by similar changes of the posterior column after disease or experimental section of individual roots, and by the changes occurring after their mechanical affection of the radicular nerves due to the increased intro-spinal pressure caused by the growth of cerebral tumors.

The noxa falls upon the root fasciculi very disparately, and this corresponds to the disparate nature of the sensory troubles, which do not preponderate so much as formerly supposed upon the fibers which subserve the sense of attitudes and of muscular movement; for it is now definitely shown that cutaneous sensations are always involved more or less, though probably later in the disease.

The superficial lightning pains described by Gowers and the psychometric analysis of the sensibility of tabetics by Vaschide are an index of this; while the researches of Head enable us to explain the modifications in terms of deep, protopathic, and epicritic sensibility. The fibers subserving the life of internal relation may differ morphologically from those subserving external relationship, as contended by Pierre Bonnier with particular reference to the eighth nerve, the principal posterior root, where the cochlear portion, whose function concerns the outside world is affected only rarely, while the vestibular portion is concerned with intrinsic relationships and is involved very commonly indeed in the tabetic process.

However this may be, it is certain that impaired sense of attitudes is always accompanied by impairment of the deep pain senses of perception of the vibrations of the tuning fork by the bones; and as these functions are conveyed in the same peripheral path, while they are separated within the cord, clinical evidence is in entire harmony with the pathogenetic theory advanced by Nageotte. The data furnished by the optic nerve symptoms are similarly best explicable by a meningeal affection involving in this case not a posterior root but a homologue of an intra-spinal path.

Those tabetic symptoms referable to the sympathetic do not differ from those when produced by experimental section of the spinal roots, nor from those in syringomyelia, which, however, attacks the cell bodies in the intermediolateral columns. Charcot's negation of changes in the sympathetic is effectively disproved by the researches of Roux, who found the medullated fibers markedly decreased in tabetics. The anterior roots are not unaffected; but the relative absence of serious myopathies early in the disease is accounted for by the rapid regeneration of the fibers. This is shown by the "terminaisons en crosissance" exhibited in Nageotte's preparations and by the results of section experiments. The regeneration of the posterior root fibers extends only to Redlich's ring, at which they lose the neurilemma sheath.

Finally lymphocytosis and reflex iridoplegia, the two most characteristic signs of tabes, are found in many cases of syphilis without the tabetic symptoms; indeed both sometimes occur in the secondary stage, the former in as many as forty per cent.

The contention of Babinski and Nageotte is therefore accepted, that a chronic syphilitic meningitis is responsible for what has been called tabes dorsalis; and that it was formerly disregarded on account of a tendency to the occurrence of resolution and fibrosis of the lesions. The practical application of this conclusion is of the greatest importance in the treatment of the disease. Cases taken early may be completely arrested; and in all cases, the active manifestations may be resolved if treated before destruction of the noble elements has occurred, though naturally the residues of former exacerbations cannot be removed.

Dr. W. G. Spiller said the subject was particularly interesting to him because he was in Vienna at the time Obersteiner and Redlich brought forward their views regarding the constriction of the posterior root fibers, and he was in Paris when Nageotte was first proclaiming his theory. Dr. Spiller said a patient had just died in his service at Blockley who had pronounced tabes with preservation of the patellar reflexes. This was tabes of the lower type. Dr. Leopold is now examining the spinal cord. Unfortunately he was unable to get the vestibular nerves; he had traveled forty miles to get the spinal cord. There can hardly be any doubt that the fibers of the column of Clarke in many pronounced cases of tabes are degenerated. Dr. Spiller said he could with the lantern slides in his demonstrations to students show the degeneration of the column of Clarke with low power. This degeneration probably has much to do with the ataxia.

As for meningitis, he thinks it is common in tabes in at least a slight form. Unquestionably syphilis is the great cause of tabes, but Dr. Spiller said he was not yet prepared to state that it is the only cause of tabes.

Dr. Williams, in closing the discussion, said he purposely omitted reference to the well known work of Dr. Spiller in his paper because he felt he had not time to discuss it. He was very glad to hear Dr. Spiller speak of the degeneration of the fibers within the column of Clarke. Nageotte insists that it is exceptional for the long fibers to be affected first, whereas the classical teaching is that the long fibers are those affected first. Dr. Spiller's experience is exceedingly valuable in that connection. Dr. Spiller's skepticism Dr. William thinks is justified. Any skepticism he has as to the theory of Nageotte is welcome. That is the only scientific attitude to take. In regard to the peripheral nerve palsies, Thomas in 1902 found that the ganglia are often involved. The peripheral terminations of these cells would then degenerate and present peripheral neuritis. In regard to tabetic degenerations, though he does not explain why it begins there, Nageotte yet shows that when a nerve fiber is attacked that the decay tends to begin at the extreme periphery just as it commences there in a decaying tree. Dr. Williams said that any little novelty he brought to the discussion laid in the facts he presented as to the Obersteiner ring. The process itself begins, as Nageotte says, in the root, but in early cases the first indication is often seen at the radicular ring, because there the nerve loses its neurilemma sheath. One might fail to notice the fact that in the root some fibers are missing, whereas the degeneration beyond the radicular ring persists and is manifest to the older methods of examination. Careful examination shows always degeneration of the posterior root, but much more marked degeneration of the spinal side of the radicular ring. The reason for that is that the nerves have lost their neurilemma sheath there. Only careful examination will show that there are in the roots regenerating fibers. The regeneration is such as to give rise to early resumption of activity in the muscles, so that it is often clinically unappreciable except by careful examination. Another point cogent in Dr. Spiller's remarks was that he had so often noted muscular atrophy. He has observed frequency of muscular atrophy in tabetics. He has also observed the frequency of meningitis. The alleged absence of muscular atrophy clinically and meningitis postmortem were two weak points in adhering to the doctrine of Nageotte. Dr. Spiller's cooperation in the removal of these objections is most gratifying to Dr. Williams, who said he was very glad indeed to have had the opportunity to present his paper before the Philadelphia Neurological Society and thanked the society very much for the manner in which his paper had been received.

THE AMERICAN NEUROLOGICAL ASSOCIATION

The Thirty-fourth annual meeting held at the College of Physicians of Philadelphia, May 20, 21 and 22, 1908

The President, Dr. Charles W. Burr, in the Chair.

The President delivered his address, entitled: The Mental State in Chorea and Choreiform Affections. (See this journal, p. 353.)

PROGRESSIVE HEMIPLEGIA DUE TO GLIOSIS AND VASCULAR LESION OF THE RIGHT CENTRUM AND CORTEX

By Frank R. Fry, M.D.

Eight weeks before the necropsy there were slight recurring spasm and paresthesia of the face, and a still slighter spasmodic tendency in the hand on the left side. There was a partial paralysis of the hand and arm which had been gradually advancing for four months. There was no paralysis in the lower extremity. There was a complete absence of objective sensory signs in the paralytic member and elsewhere. There were also absent the general signs of cerebral tumor, *i. e.*, no vertigo,